Midterm q6: Solve quadratic equations with rational solutions

All of these could technically be solved by factoring, but some will be easier with quadratic formula. You should do your work on a separate piece of paper. Solutions are on the back, shuffled.

1. Solve the quadratic equation: $5x^2 + 18x = -9$

2. Solve the quadratic equation: $6x^2 - 17x + 5 = 0$

3. Solve the quadratic equation: $20x^2 - 24x = -5x - 3$

4. Solve the quadratic equation: $10x^2 - 19x = -6$

5. Solve the quadratic equation: $14x^2 + 5x = 1$

6. Solve the quadratic equation: $6x^2 + 19x = 2x - 12$

7. Solve the quadratic equation: $12x^2 + 17x + 6 = 0$

8. Solve the quadratic equation: $x^2 - 5x = -6x + 20$

9. Solve the quadratic equation: $7x^2 - 17x + 10 = 0$

10. Solve the quadratic equation: $5x^2 - x = 6$

11. Solve the quadratic equation: $5x^2 - 4x - 9 = 0$

12. Solve the quadratic equation: $4x^2 - 9x = 9$

13. Solve the quadratic equation: $10x^2 + 25x = 8x - 3$

14. Solve the quadratic equation: $x^2 - 11x = -7x - 3$

15. Solve the quadratic equation: $x^2 + 17x = 9x + 9$

16. Solve the quadratic equation: $14x^2 - 13x + 3 = 0$

17. Solve the quadratic equation: $3x^2 + 7x = -4$

18. Solve the quadratic equation: $2x^2 - 7x + 6 = 0$

19. Solve the quadratic equation: $5x^2 - 14x = -7x - 2$

20. Solve the quadratic equation: $10x^2 - 10x = -3x + 3$

11. $x = \frac{9}{5}$ and $x = -1$

7. $x = \frac{-3}{4}$ and $x = \frac{-2}{3}$

20. $x = 1$ and $x = \frac{-3}{10}$

5. $x = \frac{1}{7}$ and $x = \frac{-1}{2}$

6. $x = \frac{-3}{2}$ and $x = \frac{-4}{3}$

19. $x = \frac{2}{5}$ and $x = 1$

3. $x = \frac{1}{5}$ and $x = \frac{3}{4}$

10. $x = \frac{6}{5}$ and $x = -1$

18. $x = 2$ and $x = \frac{3}{2}$

13. $x = \frac{-1}{5}$ and $x = \frac{-3}{2}$

8. $x = -5$ and $x = 4$

4. $x = \frac{3}{2}$ and $x = \frac{2}{5}$

2. $x = \frac{1}{3}$ and $x = \frac{5}{2}$

12. $x = 3$ and $x = \frac{-3}{4}$

15. $x = -9$ and $x = 1$

9. $x = \frac{10}{7}$ and $x = 1$

16. $x = \frac{1}{2}$ and $x = \frac{3}{7}$

14. $x = 3$ and $x = 1$

1. $x = -3$ and $x = \frac{-3}{5}$

17. $x = \frac{-4}{3}$ and $x = -1$

Midterm practice: Factor quadratic, a =prime.

You should try to factor the expression. I recommend guess-and-check. If that is giving you too much trouble, try figuring out how you can use quadratic formula.

1. If n is an integer and $(x+n)$ is a factor of polynomial $3x^2-10x+3$ then what is the value of n?

2. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2+18x+8$ then what is the value of n?

3. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2-x-6$ then what is the value of n?

4. If n is an integer and $(x+n)$ is a factor of polynomial $3x^2+7x+2$ then what is the value of n?

5. If n is an integer and $(x+n)$ is a factor of polynomial $3x^2-7x-10$ then what is the value of n?

6. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2+9x-5$ then what is the value of n?

7. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2+9x+2$ then what is the value of n?

8. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2+x-6$ then what is the value of n?

9. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2-5x-12$ then what is the value of n?

10. If n is an integer and $(x+n)$ is a factor of polynomial $5x^2-4x-9$ then what is the value of n?

11. If n is an integer and $(x+n)$ is a factor of polynomial $5x^2-12x+7$ then what is the value of n?

12. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2-3x-2$ then what is the value of n?

13. If n is an integer and $(x+n)$ is a factor of polynomial $5x^2-19x+18$ then what is the value of n?

14. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2-x-8$ then what is the value of n?

15. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2+3x-4$ then what is the value of n?

16. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2+x-15$ then what is the value of n?

17. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2+5x-3$ then what is the value of n?

18. If n is an integer and $(x+n)$ is a factor of polynomial $2x^2+9x+10$ then what is the value of n?

19. If n is an integer and $(x+n)$ is a factor of polynomial $3x^2+5x-8$ then what is the value of n?

20. If n is an integer and $(x+n)$ is a factor of polynomial $7x^2-15x+2$ then what is the value of n?

5. Factors as $(x+1)(3x-10)$ so $n=1$

16. Factors as $(x+3)(2x-5)$ so $n=3$

20. Factors as $(x-2)(7x-1)$ so $n=-2$

9. Factors as $(x-4)(2x+3)$ so $n=-4$

11. Factors as $(x-1)(5x-7)$ so $n=-1$

14. Factors as $(x+1)(7x-8)$ so $n=1$

8. Factors as $(x+1)(7x-6)$ so $n=1$

18. Factors as $(x+2)(2x+5)$ so $n=2$

10. Factors as $(x+1)(5x-9)$ so $n=1$

1. Factors as $(x-3)(3x-1)$ so $n=-3$

13. Factors as $(x-2)(5x-9)$ so $n=-2$

3. Factors as $(x-1)(7x+6)$ so $n=-1$

2. Factors as $(x+2)(7x+4)$ so $n=2$

7. Factors as $(x+1)(7x+2)$ so $n=1$

12. Factors as $(x-2)(2x+1)$ so $n=-2$

17. Factors as $(x+3)(2x-1)$ so $n=3$

4. Factors as $(x+2)(3x+1)$ so $n=2$

15. Factors as $(x+1)(7x-4)$ so $n=1$

19. Factors as $(x-1)(3x+8)$ so $n=-1$

6. Factors as $(x+5)(2x-1)$ so $n=5$

Midterm practice: Factor difference of squares

First factor any common factors. Then, identify the difference of squares to help factor the expression.

1. Fully factor $72x^2 - 2$

2. Fully factor $18x^2 - 2$

3. Fully factor $125x^2 - 5$

4. Fully factor $8x^2 - 2$

5. Fully factor $16x^2 - 4$

6. Fully factor $20x^2 - 5$

7. Fully factor $x^2 - 16$

8. Fully factor $3x^2 - 75$

9. Fully factor $75x^2 - 3$

10. Fully factor $80x^2 - 5$

11. Fully factor $50x^2 - 2$

12. Fully factor $2x^2 - 72$

13. Fully factor $x^2 - 81$

14. Fully factor $196x^2 - 4$

15. Fully factor $12x^2 - 3$

16. Fully factor $16x^2 - 1$

17. Fully factor $5x^2 - 45$

18. Fully factor $108x^2 - 3$

19. Fully factor $162x^2 - 2$

20. Fully factor $x^2 - 4$

4. $2(2x+1)(2x-1)$

12. $2(x+6)(x-6)$

2. $2(3x+1)(3x-1)$

19. $2(9x+1)(9x-1)$

5. $4(2x+1)(2x-1)$

6. $5(2x+1)(2x-1)$

17. $5(x+3)(x-3)$

7. $(x+4)(x-4)$

11. $2(5x+1)(5x-1)$

18. $3(6x+1)(6x-1)$

16. $(4x+1)(4x-1)$

10. $5(4x+1)(4x-1)$

1. $2(6x+1)(6x-1)$

14. $4(7x+1)(7x-1)$

15. $3(2x+1)(2x-1)$

13. $(x+9)(x-9)$

9. $3(5x+1)(5x-1)$

20. $(x+2)(x-2)$

3. $5(5x+1)(5x-1)$

8. $3(x+5)(x-5)$

Midterm practice: Solve with square rooting with $\pm$

Solve for x by undoing a series of operations. When you undo the squaring, remember to have a $\pm$ of the square root. You should do your work on a separate piece of paper. Answers are on the back, but shuffled.

1. Solve the following equation: $9\left((x-5)^2-13\right) = 27$

2. Solve the following equation: $\frac{1}{20}(x-6)^2+16 = 21$

3. Solve the following equation: $5(x-10)^2+3 = 128$

4. Solve the following equation: $\frac{1}{19}\left((x+7)^2-5\right) = 4$

5. Solve the following equation: $\frac{1}{9}\left((x+9)^2+11\right) = 4$

6. Solve the following equation: $\frac{1}{16}(x+4)^2+19 = 23$

7. Solve the following equation: $\frac{1}{8}(x-6)^2-2 = 6$

8. Solve the following equation: $4(x-8)^2-9 = 91$

9. Solve the following equation: $\frac{1}{8}(x+7)^2-3 = -1$

10. Solve the following equation: $3(x+6)^2-18 = 30$

11. Solve the following equation: $\frac{1}{12}\left((x-5)^2+8\right) = 6$

12. Solve the following equation: $2(x+5)^2-15 = 17$

13. Solve the following equation: $9(x-9)^2-5 = 139$

14. Solve the following equation: $2(x+6)^2+8 = 106$

15. Solve the following equation: $5(x+4)^2+16 = 141$

16. Solve the following equation: $\frac{1}{12}(x+4)^2-14 = -11$

17. Solve the following equation: $\frac{1}{2}\left((x+5)^2+16\right) = 16$

18. Solve the following equation: $\frac{1}{2}\left((x-4)^2+20\right) = 60$

19. Solve the following equation: $2(x+7)^2+3 = 35$

20. Solve the following equation: $3\left((x+9)^2+8\right) = 99$

15. $x = 1$ and $x = -9$

16. $x = 2$ and $x = -10$

19. $x = -3$ and $x = -11$

11. $x = 13$ and $x = -3$

10. $x = -2$ and $x = -10$

13. $x = 13$ and $x = 5$

17. $x = -1$ and $x = -9$

6. $x = 4$ and $x = -12$

20. $x = -4$ and $x = -14$

2. $x = 16$ and $x = -4$

14. $x = 1$ and $x = -13$

9. $x = -3$ and $x = -11$

4. $x = 2$ and $x = -16$

5. $x = -4$ and $x = -14$

12. $x = -1$ and $x = -9$

8. $x = 13$ and $x = 3$

3. $x = 15$ and $x = 5$

18. $x = 14$ and $x = -6$

7. $x = 14$ and $x = -2$

1. $x = 9$ and $x = 1$

Midterm practice: Solve with completing the square

1. Use completing-the-square to solve the equation: $x^2 + 10x - 3 = 20$

2. Use completing-the-square to solve the equation: $x^2 - 10x + 3 = 86$

3. Use completing-the-square to solve the equation: $x^2 - 8x - 5 = 6$

4. Use completing-the-square to solve the equation: $x^2 - 12x + 8 = 26$

5. Use completing-the-square to solve the equation: $x^2 + 6x + 3 = 174$

6. Use completing-the-square to solve the equation: $x^2 - 10x - 5 = 82$

7. Use completing-the-square to solve the equation: $x^2 - 6x - 8 = -9$

8. Use completing-the-square to solve the equation: $x^2 + 18x + 4 = -57$

9. Use completing-the-square to solve the equation: $x^2 - 6x + 4 = 35$

10. Use completing-the-square to solve the equation: $x^2 + 16x - 5 = 93$

11. Use completing-the-square to solve the equation: $x^2 + 16x - 8 = -44$

12. Use completing-the-square to solve the equation: $x^2 + 8x + 2 = 133$

13. Use completing-the-square to solve the equation: $x^2 - 14x - 5 = 74$

14. Use completing-the-square to solve the equation: $x^2 - 14x + 1 = 152$

15. Use completing-the-square to solve the equation: $x^2 - 8x + 4 = 42$

16. Use completing-the-square to solve the equation: $x^2 - 6x - 6 = 97$

17. Use completing-the-square to solve the equation: $x^2 - 14x - 3 = 20$

18. Use completing-the-square to solve the equation: $x^2 + 14x + 8 = 57$

19. Use completing-the-square to solve the equation: $x^2 - 8x - 5 = 126$

20. Use completing-the-square to solve the equation: $x^2 + 8x + 5 = 43$

19. $x = 4 \pm 7\sqrt{3}$

1. $x = -5 \pm 4\sqrt{3}$

11. $x = -8 \pm 2\sqrt{7}$

12. $x = -4 \pm 7\sqrt{3}$

15. $x = 4 \pm 3\sqrt{6}$

6. $x = 5 \pm 4\sqrt{7}$

7. $x = 3 \pm 2\sqrt{2}$

17. $x = 7 \pm 6\sqrt{2}$

16. $x = 3 \pm 4\sqrt{7}$

2. $x = 5 \pm 6\sqrt{3}$

9. $x = 3 \pm 2\sqrt{1}0$

18. $x = -7 \pm 7\sqrt{2}$

13. $x = 7 \pm 8\sqrt{2}$

5. $x = -3 \pm 6\sqrt{5}$

4. $x = 6 \pm 3\sqrt{6}$

8. $x = -9 \pm 2\sqrt{5}$

20. $x = -4 \pm 3\sqrt{6}$

3. $x = 4 \pm 3\sqrt{3}$

10. $x = -8 \pm 9\sqrt{2}$

14. $x = 7 \pm 10\sqrt{2}$